

Notice of Allowability

Application No.

10/823,484

Examiner

Kevin M. Bernatz

Applicant(s)

SAITO ET AL.

Art Unit

1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to interview of 10/5/06.
2. ☒ The allowed claim(s) is/are 1,4-16 and 47-72.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08)
Paper No./Mail Date 4/13/04; 10/17/05; 9/21/04; 7/26/04
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 20061015.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Examiner's Amendment

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with Jay Knobloch on October 5, 2006. The application has been amended as follows:

- Claim 1 was replaced with the following:

1. (Currently Amended) A CPP giant magnetoresistive head comprising: lower and upper shield layers with a predetermined shield distance therebetween; and

a giant magnetoresistive element comprising a pinned magnetic layer, a free magnetic layer, and a nonmagnetic layer interposed between the pinned magnetic layer and the free magnetic layer, which are disposed between the upper and lower shield layers, a current flowing perpendicularly to the film plane of the giant magnetoresistive element;

wherein a height direction is defined as the direction of leakage magnetic field from a recording medium and is perpendicular to the track width direction and the lamination direction of the layers comprising the giant magnetoresistive element;

wherein the pinned magnetic layer possesses a portion exposed at the surface facing the recording medium and a rear portion extending in the height direction beyond at least one other layer comprising the giant magnetoresistive element;

wherein an antiferromagnetic layer is provided in the rear of the giant magnetoresistive element in a height direction, for pinning the magnetization direction of the pinned magnetic layer in the height direction;

wherein the antiferromagnetic layer is in contact with the upper surface or the lower surface of the rear portion of the pinned magnetic layer extending in the height direction to produce an exchange coupling magnetic field at the interface with the upper or lower surface, so that the magnetization direction of the pinned magnetic layer is pinned by the exchange coupling magnetic field; and

wherein the antiferromagnetic layer is not exposed at the surface facing the recording medium.

- Claims 2, 317 – 46 and 73 – 83 were cancelled.

Reasons for Allowance

3. The present claims are deemed allowable over the prior art for the following reasons. The Examiner notes that several prior art references disclose antiferromagnetic (AFM) layers extending in the *track width* direction, but are distinguished over by the clarified language regarding the AFM layer extending in the *height* direction (e.g. *U.S. Patents 7,035,059 B2, 6,292,355 B1, and U.S. Patent App. No. 2003/0179515 A1*).

The claim language directed to the antiferromagnetic layer possessing both a portion and a rear portion meeting the claimed limitations serves to distinguish over MR elements possessing layers all having the same height (e.g. *U.S. Patent No. 6,327,121 B1*).

The amended language incorporating the subject matter of claim 3 into claim 1, as well as clarifying that the AFM layer is not exposed at the ABS (*supported in applicants' as-filed disclosure on page 38*), serves to distinguish over the general concept of placing a biasing element between a GMR and a CPP element (*U.S. Patent No. 5,739,987*) and over the more specific embodiment of *U.S. Patent No. 6,466,419 B1* (e.g. *see Figure 5B*).

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

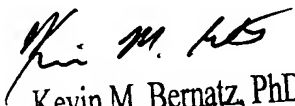
Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
October 15, 2006


Kevin M. Bernatz, PhD
Primary Examiner